Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

48. Proposed by G. B. M. ZERR, A. M., Ph. D., Texarkana, Arkansas.

Two equal heavy rings connected by a string passing over a peg at the focus of a conic section will be in equilibrium at all points on the curve.

Solution by O. W. ANTHONY, M. Sc., Professor of Mathematics, Columbian University, Washington, D. C.

An evident property of *any* curve which will be a curve of equilibrium for two weights thus attached is that the tension along the string shall be the same, wherever the weights are placed upon the curve. If this were not so, by altering the position of one of them, by changing the length of the string, the tension would be changed and the other would no longer be in equilibrium.

Call T the tension, W the weight, ϕ the angle which the curve makes with the horizontal, and θ the angle which the string makes.

Resolving along the curve,

$$W\cos\phi - T\cos(\theta-\phi)=0.$$

$$\frac{\cos(\theta-\phi)}{\cos\phi}=\frac{W}{T}=k.$$

$$\therefore\ \cos\theta+\sin\theta\tan\phi=k.$$

$$\frac{x}{\sqrt{x^2+y^2}}+\frac{y}{\sqrt{x^2+y^2}}\cdot\frac{dy}{dx}=k. \qquad \frac{xdx+ydy}{\sqrt{x^2+y^2}}=kdx.$$

$$(x^2+y^2)^{\frac{1}{2}}=kx+c. \qquad x^2(1-k^2)+y^2-2kcx=c^2.$$

This is the equation of a conic with the origin at the focus.

$$k=e+c=a(1-e^2).$$

The above investigation refers to the case in which the tension is simply constant. The string may be attached to the fixed point.

If the string be now considered passing around the focus to the curve again and a weight W attached there also, the tension will be doubled.

Then $k=W/2T$.

If $W=2T$, or $T=\frac{1}{2}W$, the equation becomes $y^2-2cx=c^2$, a parabola.

If $W>2T$, or $T<\frac{1}{2}W$, the curve is an hyperbola.

If $W<2T$, or $T>\frac{1}{2}W$, the curve is an ellipse.

The above may be put in the following form:

In a parabola the tension is equal to half one of the equal weights; in an hyperbola it is less than half of the weight; and in an ellipse it is greater than the same.